

THAT WHICH IS CLAIMED:

1. An isolated polypeptide comprising the amino acid sequence set forth in SEQ ID NO: 2, 5, 8, 11, 14, 17, 20, 23, 26, 29, 32, 35, 38, 41, 44, 47, 50, or 53.
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2. An isolated nucleic acid molecule comprising a nucleotide sequence selected from the group consisting of:
 - a) the nucleotide sequence set forth in SEQ ID NO: 1, 3, 4, 6, 7, 9, 10, 12, 13, 15, 16, 18, 19, 21, 22, 24, 25, 27, 28, 30, 31, 33, 34, 36, 37, 39, 40, 42, 43, 45, 46, 48, 10 49, 51, 52, or 54;
 - b) a nucleotide sequence that corresponds to an antisense sequence for the nucleotide sequence set forth in SEQ ID NO: 1, 3, 4, 6, 7, 9, 10, 12, 13, 15, 16, 18, 19, 21, 22, 24, 25, 27, 28, 30, 31, 33, 34, 36, 37, 39, 40, 42, 43, 45, 46, 48, 49, 51, 52, or 54;
 - c) a nucleotide sequence having at least 80% sequence identity to the sequence set forth in SEQ ID NO: 1, 3, 4, 6, 7, 9, 10, 12, 13, 15, 16, 18, 19, 21, 22, 24, 15 25, 27, 28, 30, 31, 33, 34, 36, 37, 39, 40, 42, 43, 45, 46, 48, 49, 51, 52, or 54; and
 - d) a nucleotide sequence that hybridizes to any one of the nucleotide sequence of a) - c) under stringent conditions, or a complement thereof.
3. The nucleic acid molecule of claim 2, wherein said sequence encodes an invertase inhibitor having the amino acid sequence set forth in SEQ ID NO: 2, 5, 8, 11, 14, 17, 20, 23, 26, 29, 32, 35, 38, 41, 44, 47, 50, or 53.
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4. A chimeric gene comprising a promoter capable of driving expression of a sequence in a plant cell operably linked to a nucleotide sequence of claim 2.
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5. The chimeric gene of claim 4, wherein the nucleotide sequence encodes an invertase inhibitor having the amino acid sequence set forth in SEQ ID NO: 2, 5, 8, 11, 14, 17, 20, 23, 26, 29, 32, 35, 38, 41, 44, 47, 50, or 53.

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6. The chimeric gene of claim 4, wherein said nucleotide sequence is the sequence set forth in SEQ ID NO: 1, 3, 4, 6, 7, 9, 10, 12, 13, 15, 16, 18, 19, 21, 22, 24, 25, 27, 28, 30, 31, 33, 34, 36, 37, 39, 40, 42, 43, 45, 46, 48, 49, 51, 52, or 54.
- 5 7. The chimeric gene of claim 4, wherein said nucleotide sequence is the antisense sequence of the sequence set forth in SEQ ID NO: 1, 3, 4, 6, 7, 9, 10, 12, 13, 15, 16, 18, 19, 21, 22, 24, 25, 27, 28, 30, 31, 33, 34, 36, 37, 39, 40, 42, 43, 45, 46, 48, 49, 51, 52, or 54.
- 10 8. A vector comprising the chimeric gene of claim 4.
9. A plant cell transformed with the chimeric gene of claim 4.
- 15 10. A plant comprising the chimeric gene of claim 4.
11. A transformed plant having incorporated into its genome a DNA molecule, said molecule comprising a nucleotide sequence operably linked to a promoter capable of driving expression of a gene in a plant cell, wherein said nucleotide sequence is selected from the group consisting of:
- 20 a) a sequence encoding an invertase inhibitor having the amino acid sequence set forth in SEQ ID NO: 2, 5, 8, 11, 14, 17, 20, 23, 26, 29, 32, 35, 38, 41, 44, 47, 50, or 53;
- b) the nucleotide sequence set forth in SEQ ID NO: 1, 3, 4, 6, 7, 9, 10, 12, 13, 15, 16, 18, 19, 21, 22, 24, 25, 27, 28, 30, 31, 33, 34, 36, 37, 39, 40, 42, 43, 45, 46, 48, 49, 51, 52, or 54;
- 25 c) a nucleotide sequence that corresponds to an antisense sequence for the nucleotide sequence set forth in SEQ ID NO: 1, 3, 4, 6, 7, 9, 10, 12, 13, 15, 16, 18, 19, 21, 22, 24, 25, 27, 28, 30, 31, 33, 34, 36, 37, 39, 40, 42, 43, 45, 46, 48, 49, 51, 52, or 54;
- 30 d) a nucleotide sequence that corresponds to an antisense sequence for a plant invertase inhibitor;

- e) a nucleotide sequence having at least 80% sequence identity to the sequence set forth in SEQ ID NO: 1, 3, 4, 6, 7, 9, 10, 12, 13, 15, 16, 18, 19, 21, 22, 24, 25, 27, 28, 30, 31, 33, 34, 36, 37, 39, 40, 42, 43, 45, 46, 48, 49, 51, 52, or 54;
- 5 f) a nucleotide sequence encoding a yeast invertase enzyme; and
- g) a nucleotide sequence that hybridizes to any one of the nucleotide sequence of a) - f) under stringent conditions, or a complement thereof.

12. The transformed plant of claim 11, wherein the nucleotide sequence encodes an invertase inhibitor having the amino acid sequence set forth in SEQ ID NO: 2, 5, 8, 11, 10 14, 17, 20, 23, 26, 29, 32, 35, 38, 41, 44, 47, 50, or 53.

13. The transformed plant of claim 11, wherein the nucleotide sequence is the nucleotide sequence set forth in SEQ ID NO: 1, 3, 4, 6, 7, 9, 10, 12, 13, 15, 16, 18, 19, 21, 22, 24, 25, 27, 28, 30, 31, 33, 34, 36, 37, 39, 40, 42, 43, 45, 46, 48, 49, 51, 52, or 54.

15 14. The transformed plant of claim 11, wherein the nucleotide sequence is an antisense sequence for a plant invertase inhibitor.

16. The transformed plant of claim 11, wherein the nucleotide sequence is a yeast 20 invertase.

17. The transformed plant of claim 11, wherein said plant is a dicot.

25 18. The transformed plant of claim 17, wherein said plant is a monocot.

19. Transformed seed of the plant of any one of claims 16-18.

30 20. A method for modulating invertase activity in a plant cell, said method comprising transforming said plant with a DNA construct, said construct comprising a

promoter that drives expression in a plant cell operably linked with a nucleotide sequence selected from the group consisting of:

- a) a sequence encoding an invertase inhibitor having the amino acid sequence set forth in SEQ ID NO: 2, 5, 8, 11, 14, 17, 20, 23, 26, 29, 32, 35, 38, 41, 44, 47, 50, or 53;
- b) the nucleotide sequence set forth in SEQ ID NO: 1, 3, 4, 6, 7, 9, 10, 12, 13, 15, 16, 18, 19, 21, 22, 24, 25, 27, 28, 30, 31, 33, 34, 36, 37, 39, 40, 42, 43, 45, 46, 48, 49, 51, 52, or 54;
- c) a nucleotide sequence that corresponds to an antisense sequence for the nucleotide sequence set forth in SEQ ID NO: 1, 3, 4, 6, 7, 9, 10, 12, 13, 15, 16, 18, 19, 21, 22, 24, 25, 27, 28, 30, 31, 33, 34, 36, 37, 39, 40, 42, 43, 45, 46, 48, 49, 51, 52, or 54;
- d) a nucleotide sequence that corresponds to an antisense sequence for a plant invertase inhibitor;
- e) a nucleotide sequence having at least 80% sequence identity to the sequence set forth in SEQ ID NO: 1, 3, 4, 6, 7, 9, 10, 12, 13, 15, 16, 18, 19, 21, 22, 24, 25, 27, 28, 30, 31, 33, 34, 36, 37, 39, 40, 42, 43, 45, 46, 48, 49, 51, 52, or 54;
- f) a nucleotide sequence encoding a yeast invertase enzyme; and
- g) a nucleotide sequence that hybridizes to any one of the nucleotide sequence of a) - f) under stringent conditions, or a complement thereof.

21. A method for increasing yield in a plant, said method comprising transforming said plant with a DNA construct, said construct comprising a promoter that drives expression in a plant cell operably linked with a nucleotide sequence selected from the group consisting of:

- a) a sequence encoding an invertase inhibitor having the amino acid sequence set forth in SEQ ID NO: 1, 3, 4, 6, 7, 9, 10, 12, 13, 15, 16, 18, 19, 21, 22, 24, 25, 27, 28, 30, 31, 33, 34, 36, 37, 39, 40, 42, 43, 45, 46, 48, 49, 51, 52, or 54;
- b) the nucleotide sequence set forth in SEQ ID NO: 1, 3, 4, 6, 7, 9, 10, 12, 13, 15, 16, 18, 19, 21, 22, 24, 25, 27, 28, 30, 31, 33, 34, 36, 37, 39, 40, 42, 43, 45, 46, 48, 49, 51, 52, or 54;

- 5 c) a nucleotide sequence that corresponds to an antisense sequence for the nucleotide sequence set forth in SEQ ID NO: 1, 3, 4, 6, 7, 9, 10, 12, 13, 15, 16, 18, 19, 21, 22, 24, 25, 27, 28, 30, 31, 33, 34, 36, 37, 39, 40, 42, 43, 45, 46, 48, 49, 51, 52, or 54;
- 5 d) a nucleotide sequence that corresponds to an antisense sequence for a plant invertase inhibitor;
- 10 e) a nucleotide sequence having at least 80% sequence identity to the sequence set forth in SEQ ID NO: 1, 3, 4, 6, 7, 9, 10, 12, 13, 15, 16, 18, 19, 21, 22, 24, 25, 27, 28, 30, 31, 33, 34, 36, 37, 39, 40, 42, 43, 45, 46, 48, 49, 51, 52, or 54;
- 10 f) a nucleotide sequence encoding a yeast invertase enzyme; and
- 15 g) a nucleotide sequence that hybridizes to any one of the nucleotide sequence of a) - f) under stringent conditions, or a complement thereof.

22. A transformed plant cell having incorporated into its genome a DNA molecule, said molecule comprising a promoter capable of driving expression of a gene in a plant cell operably linked to a nucleotide sequence selected from the group consisting of:
- 15 a) a sequence encoding an invertase inhibitor having the amino acid sequence set forth in SEQ ID NO: 2, 5, 8, 11, 14, 17, 20, 23, 26, 29, 32, 35, 38, 41, 44, 47, 50, or 53;
- 20 b) the nucleotide sequence set forth in SEQ ID NO: 1, 3, 4, 6, 7, 9, 10, 12, 13, 15, 16, 18, 19, 21, 22, 24, 25, 27, 28, 30, 31, 33, 34, 36, 37, 39, 40, 42, 43, 45, 46, 48, 49, 51, 52, or 54;
- 25 c) a nucleotide sequence that corresponds to an antisense sequence for the nucleotide sequence set forth in SEQ ID NO: 1, 3, 4, 6, 7, 9, 10, 12, 13, 15, 16, 18, 19, 21, 22, 24, 25, 27, 28, 30, 31, 33, 34, 36, 37, 39, 40, 42, 43, 45, 46, 48, 49, 51, 52, or 54;
- 30 d) a nucleotide sequence that corresponds to an antisense sequence for a plant invertase inhibitor;
- 30 e) a nucleotide sequence having at least 80% sequence identity to the sequence set forth in SEQ ID NO: 1, 3, 4, 6, 7, 9, 10, 12, 13, 15, 16, 18, 19, 21, 22, 24, 25, 27, 28, 30, 31, 33, 34, 36, 37, 39, 40, 42, 43, 45, 46, 48, 49, 51, 52, or 54;

- f) a nucleotide sequence encoding a yeast invertase enzyme; and
- g) a nucleotide sequence that hybridizes to any one of the nucleotide sequence of a) - f) under stringent conditions, or a complement thereof.